

BRIEFING NOTE

SENEGAL

Key findings

- The percentage of the population with access to improved sanitation facilities in urban centres and rural settlements are respectively estimated at 70% and 39%, while water supply coverage is 56% and 93%, respectively for rural and urban water supply.
 - Urban water target is on track to meet the MDG target;
 - Sanitation is lagging behind with rural areas still requiring a lot of effort.
- Of the total deaths in Senegal, 16.5% are WASH-related with the overwhelming proportion of these deaths being of young children¹.
- In Senegal severe droughts cause water shortages and in the past have led to accelerated urbanisation.
- Senegal has a Sanitation Directorate in charge of planning, implementation and control of sanitation infrastructure in rural areas.
- Existing capacity is higher in the water supply sector than in the sanitation sector.
 - Private sector dominates in terms of capacity.
 - Capacity is higher in management and finance in both sectors as a result of the transfer of main activities such as construction and O&M to private companies and NGOs.
- A shortage of approximately 640 and 1,160 staff exists to meet the MDG targets and universal coverage respectively.
 - To achieve universal coverage, an approximate 35% increase of existing professionals in the sanitation sector will be required.
 - To achieve universal coverage for water supply, almost double the number of existing professionals working in the sector will be needed.
 - There are sufficient management, finance and social development human resources in the job market, as opposed to the water and sanitation technical fields, where shortages are observed and real needs identified in the hydraulics and sanitation engineering fields.
- Gaps identified by the private sector are skilled plumbers, artisans, technicians.

Background

This Briefing Note summarises the findings from an IWA-led study in Senegal, made possible through the support of the United States Agency for International Development (USAID) under the auspices of their West Africa WASH (WA-WASH) program and was co-funded by Department for International Development (DFID UK). It sets out to assess the human resources (HR) needs to provide water supply and sanitation services in four countries: Senegal, Ghana, Niger and Burkina Faso. The study was executed by Cheikh Anta DIOP (UCAD) Doctorate School of Water Quality and Usage. The study was supported by Cap-Net who facilitated the connections with the country study team.

Senegal is a Sahelian country located in western Africa, bordering the North Atlantic Ocean, between Guinea-Bissau and Mauritania and covers an area of 196,190 square km. Just over 13 million people live in Senegal. Senegal is mainly a low-lying country, with a semi desert area in the north and northeast and forests in the southwest. High rural poverty and limited access to rural infrastructure and basic services have fuelled migration to urban areas and the country's informal sector accounts for about 60% of its gross domestic product (GDP). The Senegalese government has put policies and strategies in place to provide the rapidly-growing population with drinking water and sanitation facilities in both rural and urban areas. In the 1980s Dakar's (capital) population already reached two million inhabitants, with a related strong demand on water and sanitation for households, growing industries and increased tourism. As a result, the city faced a water shortage that was estimated at 100,000 m³ per day in 1996, compounded by poor drinking water quality. The government reacted by introducing an ambitious reform plan combined with a substantial investment programme of US\$450 million via a water sector project (WSP) and a long-term water sector project (PELT).

Assessment approach

The main objective of this study was to assess human resource requirements in the water supply and sanitation sectors to facilitate achieving MDGs target 7c in Senegal. In addition, the methodology adopted in this study also estimated the human resources requirements to achieve universal coverage of water supply and sanitation for the predicted population in 2015.

The study focused on the human resource requirements from the public sector and parastatal institutions, and the private sector (private consultancy companies, individual contractors, etc.), as well as NGOs and CBOs active in the WASH sector.

Methodological framework

To assess the human resources requirements in WATSAN sector, in terms of numbers (shortages), skills and competencies (gaps), the methodological framework, has set the following steps to:

1. Estimate population forecast for 2015 to take care of growth's rates.
2. Determine current water supply and sanitation coverage and calculate increases needed to achieve a) the MDGs and b) universal coverage.

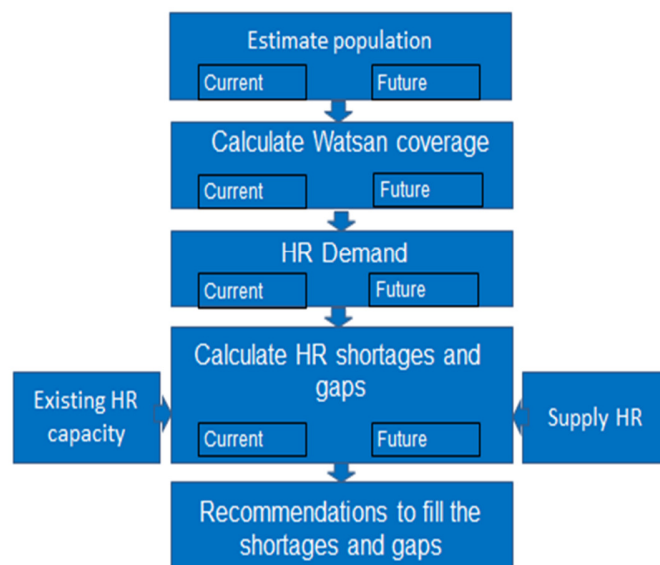


Figure 1: Methodological framework to assess human resource shortages and gaps

3. Estimate a proxy of HR demand per type of service delivery per 10,000 people.
4. Determine existing HR capacity in the country in terms of numbers and skill sets.
5. Assess HR supply in the years up to 2015 in terms of graduates as well as vocational training.
6. Calculate HR shortages and assess its gaps.
7. Provide recommendations for the way in which training institutions can address shortages and gaps, as well as provide recommendations for alternative ways to meet these shortages and gaps.

Disciplines to map human resources capacity

The study used the following disciplines to map human resources capacity in water supply and sanitation sectors:

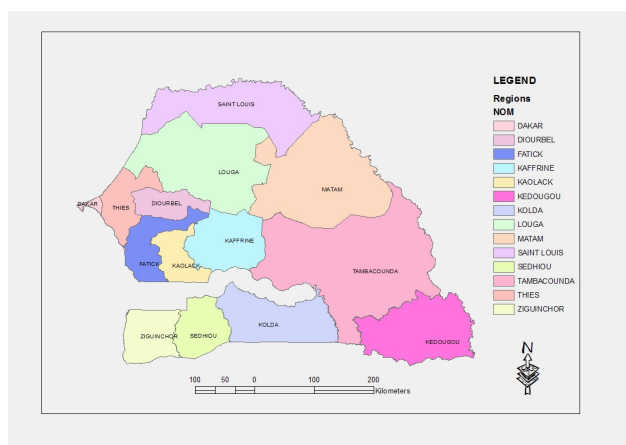
- **Technical specialisation specific to water and sanitation services (WATSAN technical field):** a person who is professionally engaged in a technical field focusing on water supply and sanitation facilities or infrastructures (for instance civil/environmental engineers).
- **Technical specialisation, not specific to water supply and sanitation services (Other technical field):** a person who is professionally engaged in another technical field required in terms of planning, design or operation of water and sanitation facilities or infrastructures (such as hydro-geologists, mechanical/electrical engineers), but is not only focused on water and sanitation sector.
- **Management and finance:** a person who is professionally engaged in management (for instance finance, human resources or strategic managers and office managers fulfilling administrative functions) as well as persons who provides goods and services or cost planners.
- **Social development:** a person who is professionally engaged in hygiene promotion or other relevant water, sanitation and health sectors, focused on social sciences issues (for instance health promotion specialist, sociologist, community development worker).

Components of the WASH service delivery pathway

The study investigated the capacity of four disciplines, whilst distinguishing human resource requirements for three different types of work noted below.

- Design and construction;
- Operation and maintenance;
- Community mobilisation/sanitation and hygiene promotion.

Location and data collection



During this study, data was collected from all Senegalese administrative regions (14), divided into 45 departments. The main organisations in the sample included five central and local directorates, 25 private water and sanitation companies, nine NGOs, and a local training and research institutions. Data related to population was collected from various sources: National Census for Big Cities (>500 K), from the Municipal Development Agency Database for large and small towns and PEPAM database for rural and dispersed villages.

For qualitative data input, a kick-off meeting was used to identify key persons in WASH sector; and initiate-intensive discussions that provided opportunities to collect data and obtain additional anecdotal information and feedback on suggestions toward how to best achieve research objectives. Data was collected using structured questionnaires and interviews.

Assumptions

The study hinged on a number of methodological and country specific assumptions:

- Existing coverage data are sufficiently accurate;
- The methodology uses Joint Monitoring Programme (JMP)¹ coverage definition, which is 'improved' levels of water and sanitation;
- Different settlement sizes are typically served in each country by the same water and sanitation service delivery mechanism; and
- The methodology assesses professionals, hence does not include household and community involvement. The data were disaggregated and allocated to settlements types, as well as service categories. It was assumed that that 10% of HR was allocated to construction activities, 25% to O&M and 65% to community mobilisation for both water and sanitation sectors.

Limitations of the study

The main constraints of the study were:

1. The methodology set out to use the sample to arrive at an estimated average, which could then be multiplied by the number of public and private sector organisations in the sector. This was considered a difficult task because not all organisations are registered or known.
2. In Senegal, data was gathered and aggregated at national level while in the IWA methodology, estimates had to be considered for decentralised levels. An accurate estimate of HR capacities, needs and shortages in the WASH sector – for both public and private sector – was difficult to achieve because a number of central organisations could not respond to questions and in most cases estimates were done by local technical authorities.
 - a. Construction, maintenance, community mobilisation as well as distribution in terms of types of settlements were problematic as in most of the companies interviewed, WATSAN and others engineers were involved in numerous functions simultaneously.
 - b. Many organisations did not clearly distinguish those working in operation and maintenance (O&M), or those in community mobilisation. The same applied to the sanitation sector. An assumption and a proxy for calculation were thus made, using existing HR data.
3. Even though a number of private construction companies did not respond to the questionnaire, a proxy HR demand (to fulfil a fair service) was taken by considering the activities (water/sanitation) and areas of intervention.
4. Due to its religious status, Touba City² is experiencing rapid urbanisation and is the second biggest city in Senegal. Despite its status, the city is still classified administratively as a rural village. Therefore, water supply is not under the control of the existing water supply company (SDE) which is a private operator in charge of urban water sector management improvement. This means that Touba is as big as a city in terms of population, but since it is administratively considered as a rural village it cannot benefit from the level of services that its population numbers warrant.

¹ <http://www.wssinfo.org/>

² Touba (founded in 1887) is a city in central Senegal and is the holy city of Mouridism. It is the burial place of its founder Shaik Aamadu Bamba Mbakke. The Great Mosque was completed in 1963 and since then the city has grown at a rapid pace, from under 5,000 inhabitants in 1964 to 529,000 in 2007.

5. In rural areas, water supply, maintenance and management are managed through organisations such as ASUFOR (Associations des Usagers de Forages, meaning borehole water-users organisations) with an executive bureau of three to four persons and a local technician for small maintenance activities. There are about 487 ASUFORs operating throughout the country. These are key stakeholders recognised by water authorities, and these persons are not qualified engineers or technicians.

Sector context

Senegal is subdivided into 14 regions, 45 departments, 103 districts, 110 municipalities and 320 rural municipalities. In this context, some major WATSAN programmes have been carried out by water authorities in order to improve service delivery. These programmes started from PSE (Water Sector Programme) in 1995 and PELT (Long-Term Water Programme) in 1999. To achieve the MDG targets, PEPAM (Drinking Water and Sanitation Millennium Programme) was launched in 2000 with the objective to reduce by half the (proportion of the) population that do not have access to water and adequate sanitation by 2015. PEPAM was created to coordinate the implementation of different agencies' activities. In 2008, the Public Service Act of Drinking Water and Sanitation (SPEPA) institutionalised delegation and management contract principles already successfully tested between 1996 and 2004 as part of the pilot project Reform of Rural Management Drilling Motor (REGEFOR). Recently, a new Water Code that involves integrated water resource management (IWRM) was set up by the government.

Seven main stakeholder groups are involved in WATSAN provision:

1. **Government Institutions:** Ministry of Hydraulic and Sanitation coordinates interventions, investments, mobilisation and projects designed and implementation with the help of the directorates, offices and water agencies.
2. **Transboundary catchment organisations, OMVS (Organisation pour la Mise en Valeur du Fleuve Sénégal) and OMVG (Organisation pour la Mise en Valeur du Fleuve Gambie):** OMVS coordinates four countries (Senegal, Mali, Mauritania and Guinea) which share Senegal River while OMVG manages the Gambia River catchment for the following countries: Senegal, Gambia, Guinea and Bissau Guinea.
3. **Private sector** is involved in the WATSAN sector and is a full participant in service provision through the construction of infrastructure. The country developed strong public-private partnerships (PPPs), that involve international and local financial institutions and international and local private companies.
4. **Donors:** Senegal receives, through various bilateral cooperation agreements, support for water provision in rural areas and numerous banking institutions support investments to achieve the MDG targets.
5. **International and national NGOs and civil organisations** are involved in both rural and urban water sectors supporting infrastructure and community mobilisation programmes.
6. **Water users:** in urban areas consumers participate in water associations where they have a platform from which they defend their right to good service quality. Consumers are also members of water boards where they participate in policy making, evaluation and application of water tariffs.
7. **Local water associations** were established during first rural water management reform with the aim to reinforce local capacities and manage their own water infrastructure.

Institutional framework for service delivery

- **Ministry of Water and Sanitation** is in charge of policy and strategy development, implementation and planning of programmes and projects, disbursements of donor funds and performance monitoring.
- **PEPAM Unit** is in charge of fundraising and coordination of different WASH organisations activities, as well as monitoring and evaluating programmes.

- **Hydraulic Directorate** is in charge of planning, implementation and control of new boreholes and other water supply infrastructures in rural areas.
- **Sanitation Directorate** is in charge of planning, implementation and control of sanitation infrastructures in rural areas.
- **Exploitation and Maintenance Directorate** is in charge of technical maintenance, advising and infrastructure transfer to water users associations in rural areas. The directorate has a number of representatives in 15 departments in charge of boreholes and modern well maintenance.
- **ONAS (Office National de l'Assainissement du Sénégal)** is responsible for implementing sanitation in urban areas.
- **SONES (Société Nationale des Eaux du Sénégal)** is responsible for implementing water supply in urban areas.
- **Water Resource Management and Planning Directorate** is in charge of inventory and management of hydraulic infrastructures as well as groundwater and surface water monitoring and management.
- **OLAG (Office du Lac de Guiers):** Guiers Lake Office is in charge of lake management.

Population, existing coverage

The population is estimated at 13 million inhabitants with approximately 70% living in rural areas. Since a severe drought in the 1970s, a rapid urbanisation rate of 3.9% has been experienced in the Dakar region. In other regions, the urban growth rate is 2,5 %, lower than the rural growth rate of 3.9%. This has led to an increasing demand of WATSAN services which required substantial infrastructural investments to improve access and reduce poverty and concomitant health problems.

Population figures	2010 population	Future population 2015
Existing total population	13,001,508	15,370,250
Dispersed rural (<10K)	7,498,925	9,079,810
Rural villages (10 K-50K)	815,663	987,617
Small town (50 K- 100K)	361,217	408,680
Large town (100K -0.5 MI)	1,786,430	2,021,180
City (> 0.5ML)	2,539,273	2,872,950

Table 1: Population distribution in Senegal based on National census data published³

Water and Sanitation coverage

According to JMP figures in 2010, the population that has access to sanitation in urban centres and rural settlements are respectively estimated at 70% and 39%, while water supply coverage is 56% and 93%, respectively for rural and urban water supply. These figures differ from those established by the PEPAM especially on rural water supply coverage, which is likely due to varying definitions of access

WATSAN Facilities Requirements	Coverage by JMP (%)	Coverage by PEPAM (%)
Existing rural water Supply Coverage	56	80.1
Existing urban water Supply Coverage	93	98.7
Existing rural sanitation Coverage	39	34.3
Existing urban sanitation Coverage	70	63.3

Table 2: WATSAN coverage figures for Senegal (WHO/UNICEF JMP 2010)⁴

³ <http://ns.cse.sn/fao/population.htm>

⁴ JMP is used for the purpose of the study

Main types of improved water and sanitation service provision

Dakar receives about 60% of its water from Guiers Lake which is one of Senegal River's catchments. To supplement demand, groundwater is pumped from different aquifers through boreholes and piped to a distribution network. In other regions, water supply is provided through boreholes. In these towns, water supply is ensured by the private water company (SDE).

In rural areas, water supply is either from boreholes, modern wells or dug wells equipped with electrical, solar or manual pumps. Water systems are managed by local associations called ASUFOR which are in charge of maintaining boreholes equipment under the supervision of administrative technicians and engineers. There are still many villages that drink from raw surface water without any treatment or from traditional wells, to the detriment of their health.

The quality of aquifers in the country is quite poor and investigations have shown high concentrations of fluoride, boron and chloride. Water treatment facilities are being planned.

MDG targets in rural and urban water and sanitation

WATSAN	MDG Target by JMP (%)	MDG Target by PEPAM (%)
Rural water Supply	72	82
Urban water Supply	94	98
Rural sanitation	61	63
Urban sanitation	81	78

Table 3: Targets for Senegal⁵

Table 3 describes the national targets, as defined by the PEPAM in 2000 and the water and sanitation related MDG target according to JMP. Using MDG targets, universal coverage targets and applying the methodological framework, deficits in achieving the MDG targets and universal coverage in various population settings are noted in the table 4. The table shows concerted efforts are needed in rural areas, where deficits are in the millions, and double when we look at universal coverage deficit. It must be recognised, however, that the urban sanitation moving from MDG to universal coverage indicate a tenfold increase in deficit.

	RURAL POPULATION that needs to gain access to water for the MDGs to be met	RURAL POPULATION that needs to gain access to water for universal coverage to be achieved
Dispersed rural communities	2,338,065	4,880,412
Rural villages	254,313	530,846
Small town	48,231	72,752
Large town	217,552	359,802
City	339,053	511,430
	RURAL POPULATION that needs to gain access to sanitation for the MDGs to be met	RURAL POPULATION that needs to gain access to sanitation for universal coverage to be achieved
Dispersed rural communities	2.614.103	6.155.229
Rural villages	284.338	669.508
Small town	78.182	155.832
Large town	386.656	770.681
City	549.602	1.095.463

Table 4: MDG and universal coverage deficit in different population settings

⁵ JMP target is used in this study

Human resources in the WASH sector

Future HR demand

In this instance 'demand' refers to what is considered 'ideal' to serve the population under current coverage figures and hence does not necessarily correspond to what is currently in place, which could include areas where coverage is below recommended standards. The basis of this approach estimating future HR demand is to use an estimate of HR employed to serve 10,000 people (HR demand ratio). These ratios were first adjusted to account for inadequacy of existing service delivery, then used to calculate the required demand to sustain the future populations (of MDG coverage by 2015; and universal coverage by 2015).

To achieve targets by year 2015, efforts have to be made to increase existing number of personnel in the WATSAN technical field but also in the field of management, finance and social development. It showed a very high future demand for WATSAN technical field and managers and finance disciplines which are estimated to be about three to four times the existing HR demand. Differences between HR demand to reach the MDG targets and universal coverage in both sectors are small. Table 5 summarises the future HR demand in both water and sanitation sectors to achieve MDG targets and universal coverage

FUTURE HR DEMAND FOR WATER IF ACHIEVING MDGs	WATSAN technical field	Other Technical field	Management & Finance	Social Development
Water delivery: dispersed rural communities	0	0	0	122
Water delivery: rural villages	49	40	57	84
Water delivery: small towns	42	42	54	78
Water delivery: large towns	69	96	102	45
Water delivery: city	441	165	868	36
Total HR Demand for Water Supply	600	343	1081	364
FUTURE HR DEMAND FOR SANITATION IF ACHIEVING MDGs	WATSAN technical field	Other technical field	Management & Finance	Social Development
Water delivery: dispersed rural communities	0	0	0	44
Water delivery: rural villages	18	15	23	33
Water delivery: small towns	15	15	20	29
Water delivery: large towns	26	35	38	16
Water delivery: city	163	61	321	13
Total HR Demand for Sanitation	221	127	401	136

HR Demand to achieve universal coverage

FUTURE HR DEMAND FOR WATER IF ACHIEVING UNIVERSAL COVERAGE	WATSAN technical field	Other technical field	Management & Finance	Social Development
Water delivery: dispersed rural communities	0	0	0	170
Water delivery: rural villages	68	56	79	116
Water delivery: small towns	44	44	57	83
Water delivery: large towns	74	102	109	48
Water delivery: city	469	176	923	38
Total HR Demand for Water Supply Sector	655	378	1,168	454
FUTURE HR DEMAND FOR SANITATION IF ACHIEVING UNIVERSAL COVERAGE	WATSAN technical	Other technical	Management & Finance	Social Development

	field	field		
Sanitation delivery: dispersed rural communities	0	0	0	73
Sanitation delivery: rural villages	29	24	38	54
Sanitation delivery: small towns	19	19	24	36
Sanitation delivery: large towns	32	44	47	20
Sanitation delivery: city	201	75	396	16
Total HR Demand for Sanitation sector	281	162	504	199

Table 5: HR demand for universal coverage

There is relatively little difference between the demand for HR to achieve the MDGs versus the universal coverage targets for water, even though rurally a much larger increase is needed. HR demand is particularly low in dispersed rural areas, where service provision depends largely on the communities themselves that are not estimated within this study. In these areas, there is a higher demand in the social development category, which could be explained by the need for more awareness raising and community mobilisation in order for communities to manage the systems themselves.

The results have shown that the more urbanised areas have the highest demand for professional capacity. This holds for all job disciplines except for social development that is exactly the opposite. Social development HR demand in dispersed villages represents 33% of the total existing HR demand. This high demand for rural area in social development personnel can be justified by the role played by NGOs, Associations as well as ASUFORs. Also, it was noticed high HR demand in management and finance, in small and large towns. The figures show also relatively equal total demand of WATSAN and other technical fields nationwide – but HR demand in all categories is much higher in cities, and towns.

Demands for WATSAN, other technical fields, and management and finance categories in dispersed rural villages are included in rural villages and small towns since public, private and NGOs that cover these areas are mostly settled in towns or villages.

Existing Human resource capacity

Table 6 summarises the total pool of existing HR capacity in the WATSAN sectors, revealing that capacity is higher in the water supply sector (1,077) than in the sanitation sector (749). The private sector dominates in terms of capacity, as in Senegal there is strong private participation into the sector in the form of strong public-private partnerships (PPPs). Capacity is higher in management and finance in both sectors where the shift of responsibilities for construction and O&M to the private sector and NGO, in combination with better salaries, has resulted in attracting additional personnel in this discipline. NGOs have less HR capacity for engineers and social development workers as they tend to rely more on volunteer involvement due to financial constraints. Higher salaries in the private sector cause the transfer of technical staff from the public to the private sector which lowers HR capacity in the public sector.

Water sector	WATSAN technical field	Other technical field	Management & finances	Social development	Total
Total NGO	19	39	27	45	130
Total Private Sector	66	109	453	171	801
Public	83	48	14	1	146
TOTAL	168	196	494	217	1077
Sanitation sector	WATSAN technical field	Other technical field	Management & finances	Social development	Total
Total NGO	19	39	27	45	130
Total Private Sector	44	73	302	114	534
Public	42	23	14	6	85
TOTAL	105	135	343	165	749

Table 6: Existing HR capacity in the water supply and sanitation sectors

Public sector services

In the public sector, HR staff is employed at ministries, directorates and regional offices to deal with policies, implementation and monitoring of both water and sanitation projects for programmes in urban and rural areas. Staff categories include WATSAN engineers, other engineers and technicians, managers and administration support staff. In the public sector there is a lack of qualified personnel for a wide range of WATSAN interventions nationwide.

For the past two decades, recruitment in the public sector has slowed down because of financial constraints and recruitment restrictions introduced by the government. During this period, most highly-skilled personnel retired or moved to better-paid jobs. Current qualified personnel are specialising in programme and project design and are sometimes involved in O&M. This situation may explain the reforms put forward to transfer water supply to SONES, sanitation to ONAS, and rural infrastructure maintenance to local communities (ASUFOR) – but also to hire the services of private companies.

Private sector

In this sector, there are differences between companies depending on their size, activities, and areas of intervention. A company like SDE has highly-qualified WATSAN and other engineering personnel. Construction and consulting companies lack qualified WATSAN engineers as they are restricted by the types of interventions which are mainly projects based. Their gaps are linked to the short-term nature of projects and they tend to hire part-time personnel for implementing projects or also use on-the-job training personnel with good experience.

NGO and Association

NGOs work in both construction and social mobilisation and associations work mainly in community mobilisation primarily to promote health and hygiene. For NGOs working in construction, jobs are not attractive enough to hire engineers because their salaries are low. However, this sector actively employs social science personnel and geographers. They work mainly on projects related to water resources management, environmental issues and hydrology, lakes and catchments monitoring. They are also employed as qualified engineers to conduct projects and act as managers during the project lifespan. Because of a lack of funding, NGOs also hire inexperienced graduate engineers as probationers or volunteers. Associations such as ASUFOR hire unqualified personnel coached by local WASH offices or NGOs.

Rural versus Urban

The difference between rural and urban areas in terms of HR capacity is mainly due to the type of WASH interventions. The presence of NGOs and association is more pronounced in rural areas than it is in urban settings because of their role for advocacy and social mobilisation.

Gender inequality

In all organisations investigated, there were large discrepancies between the number of female and male staff in WATSAN and WASH sectors with most pronounced inequality in the engineering field. This situation is not exclusively prevalent in WASH sector as there is a serious gap in all technical and scientific fields spanning from secondary school to university level. The percentage of students (female and male) going to attend university is approximately 30%, with less than 10% female and among these, very few engage in a WASH or WATSAN-oriented career. However, in categories like community mobilisation, females are encouraged to work in the sector because they can play a pivotal role in advocacy and community mobilisation in rural areas. In some private sector companies, females hold positions in management and finance, but overwhelmingly in social development.

Education levels and salaries situation

Education levels are considered as acceptable. Existing training institutions provide good levels of technicians and engineers. However, new graduates always need to be supervised to be efficient.

In the public sector, both technicians and engineers' salaries are considered to be low. This situation does not motivate existing personnel and does not attract new graduates into the sector. On the other hand, the situation seems to be better in the private sector.

HR supply to the water supply and sanitation sector

Universities and technical Institutions

In Senegal, three types of institutions train people in water and sanitation:

- **Polytechnic institutions (Ecole Supérieure Polytechnique, Ecole Polytechnique de Thies, Ecole Nationale d'Agriculture de Thies)** train students to become technicians or engineers.
- **Academic institutions (University Cheikh Anta Diop, University of Thies, University of Saint Louis, University of Ziguinchor, and University of Bambey)** offer courses relevant to WATSAN sector in water sciences, civil engineering, geography, sociology, environmental sciences, and economics and management.
- **Professional and private schools (Ecole Nationale de Développement social, Institut Africain de Management, Ecole Nationale d'Economie Appliquée, Ecole Nationale d'Administration, Institut Supérieur de Management)** are very close to professional colleges where social development, management and finance, administration are offered.

There is a lack of professionally-dedicated institutions that offer specific WASH-sector training, except for hydraulics, engineering, and electro-mechanical training. In most of the companies interviewed, the engineers are civil or mechanical engineers.

Table 8 summarises number of people trained annually in different categories such as WATSAN technical fields, other technical fields, management and finance and social development and provides the approximate percentages and numbers of HR entering the WASH sector per year.

TYPE OF TRAINING INSTITUTION	WATSAN technical field	Other technical field	MANAGEMENT & FINANCE	SOCIAL DEVELOPMENT
Total estimate of HR supply to WATER sector per year	28	21	38	48
Total estimate of HR supply in WATER sector to 2015	140	106	190	240
Total estimate of HR supply to SANITATION sector per year	7	1	10	10
Total estimate of HR supply in SANITATION up to 2015	35	6	48	48

Table 5: Estimate of HR supply in WASH per year and by 2015

Data shows sufficient management, finance and social development HR in the job market, as opposed to the WATSAN technical field where shortages are observed and real needs identified in the hydraulics and sanitation engineering fields. Despite that, the total annual training capacity for WATSAN-related engineering courses in higher education institutions is too low to meet demand in this sector.

Considering the estimated HR needs to meet the MDG and universal coverage for the WATSAN technical field, and other peripheral technical fields as well as finance, management and social development, it will not be possible to meet the demand. To improve the situation or overcome this deficit, a much higher percentage of trainees and training institutions need to be developed for the sector. The proviso is that the training institutions should adapt their curricula to meet the real needs of the WATSAN sector. This can be done provided that jobs in WATSAN and WASH sectors are developed and the number of graduate trainees increased.

Human resource shortages: comparing HR demand with capacity and supply

Quantifying the shortages	WATSAN technical field	Other technical field	Management & Finance	Social Development	TOTAL
Water sector					
HR shortage for achieving MDGs	292	42	397	-93	638
HR shortage for achieving universal coverage	347	77	484	-3	905
Sanitation sector					
HR shortage for achieving MDGs	81	-14	11	-77	1
HR shortage for achieving universal coverage	141	21	114	-14	262
Total HR shortage for achieving MDGs	374	27	407	-170	639
Total HR shortage for achieving universal coverage	487	98	598	-16	1167

Table 6: HR shortages to achieve MDGs and universal coverage (= HR demand – capacity – supply)

Approximately 640 and 1,160 additional staff is needed to meet the MDG targets and universal coverage respectively. Most of the personnel that the sector needs to address the gaps, lies within the management and finance categories. This is where sufficient supply is brought to the Senegalese labour market, but little is taken up by the WASH sector. It illustrates that other sectors compete for the staff, and the WASH sector's limited ability to pay decent salaries drive these people out of the sector, or never attract them in the first place.

Also, the WATSAN technical and the other technical fields face significant shortages, in order to continue to serve the existing and deal with expansion of future population. Urbanisation, particularly in the Dakar region, explains the relatively high numbers of shortages in the urban areas. The social development discipline remains low, and is higher in more rural areas, where services are less dependent on skilled, professional capacity.

Sanitation, even though further behind, is estimated to have fewer shortages, indicating approximately 25% of the total HR shortages in the sector. An approximate 35% increase of current professionals in the sanitation sector is needed. Even though Senegal is one of the few countries with a dedicated sanitation directorate, it seems that the level of qualification for sanitation implementation is relatively low.

For the water sector to achieve universal coverage requires almost double the amount of current professionals working in the sector.

HR shortage in both water supply and sanitation sectors may be due to different causes:

1. Skills taught in higher education institutions to fill the shortages of technicians and WATSAN engineers are not always appropriate;

2. There are no institutions in Senegal dedicated to train a sanitation curricula;
3. The lack of interest in the sanitation sector by engineers and other categories is influenced by low salaries;
4. NGOs as well as most private companies offer temporary jobs tied to projects and programmes and therefore jobs in this sector are not competitive; and
5. Skilled engineers prefer to stay in urban areas rather than in rural areas.

Gaps were mostly identified by the private companies that took part in the study, and were mainly about the skills of plumbers, artisans, technicians, and in the area where specialised technicians should move from hydraulic technicians to sanitation engineers. This is an area for which much more vocational and on-the-job training is required.

Recommendations for meeting human resource needs

Reforms have been introduced already in the urban and rural water sector to improve the Senegalese institutional framework since 1996. New reforms are to be implemented because of the important demand recorded in the water sector due mainly to a rapid population growth and of the increase of the awareness of populations that want to contribute and to participate to improve their local development. Recommendations particularly targeted at addressing the HR shortages are:

- The Government of Senegal has experience with a successful public private partnership in the water sector, and this could be explored for the sanitation sub-sector, as the private sector may well provide better incentive packages to attract more human resources into the sector.
- Recognise the important role of social partners as contributors, in terms of financial resources, as well as in the area of awareness raising on protection of water sources and the promotion of good sanitation and develop appropriate hygiene programs.
- Provide incentives for staff to work in areas where the needs are greatest which may mean working in remote rural areas
- Recently the Government of Senegal has accepted to drastically increase the number of universities from two (university of Cheikh Anta DIOP and the university of Saint Louis) to include three (Thies, Bambey and Ziguinchor) making a total of five, but further education related recommendations are:
 1. Supporting and encouraging training institutions to develop professional curricula dedicated to the WASH sector, with a particular focus on developing sanitation curricula both at undergraduate (short-term solution) and graduate (long-term solution)
 2. In Senegal, most training and WASH institutions are centralised in Dakar. There is a real need to decentralise training institutions to make it more accessible to other regions;
 3. There is a need to create vocational courses and technical school for technicians, artisans; this should be done in close collaboration with implementation of agencies and companies involved in WATSAN sectors at all levels;
- Overall, but particular in the public sector efforts will be needed to improve work conditions in order to retain skilled personnel in the sector;
- Promotion of female interest in the sector not only in social development but also in the technical and engineering fields is recommended;

A concerted effort should be made to recruit personnel into the WATSAN sector to fill the gap caused by ageing personnel.

Full references are noted in the full country assessment reports